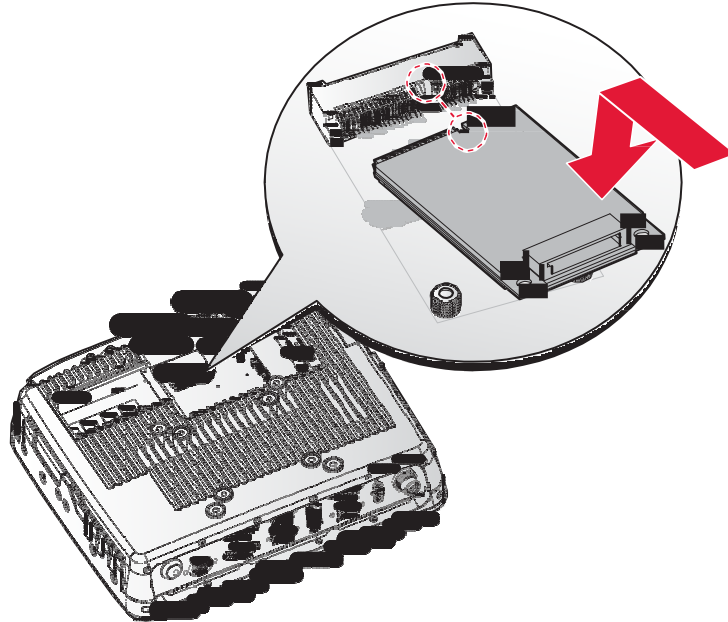8. Align the indentation on the PCIe card with the protrusion on the slot connectors.

9. Angle the card and slide it in place. Gently push the card in to seat correctly.

10. Press the opposite end down over the screw posts. The holes on the card must line up with the holes in the screw posts.

Figure 36. Installing a mini PCIe Card

11. Secure the mini PCIe card to the VM-521 with the provided screws.
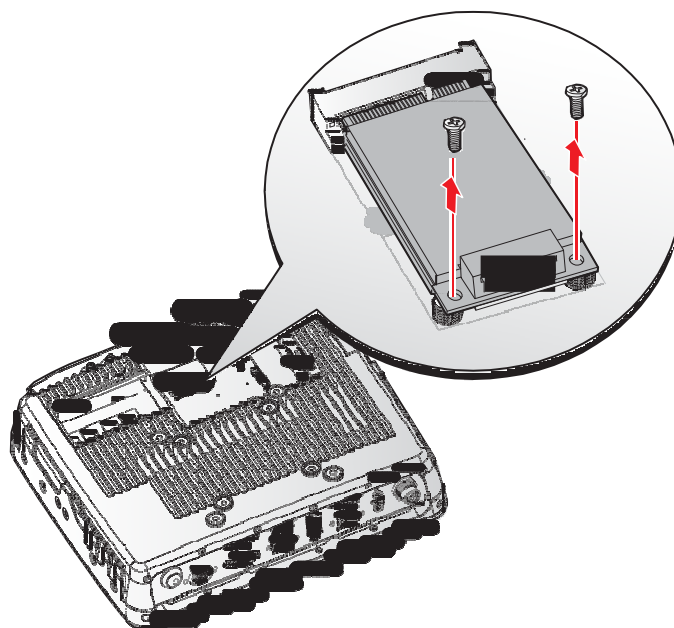
Figure 37. Securing the Screws
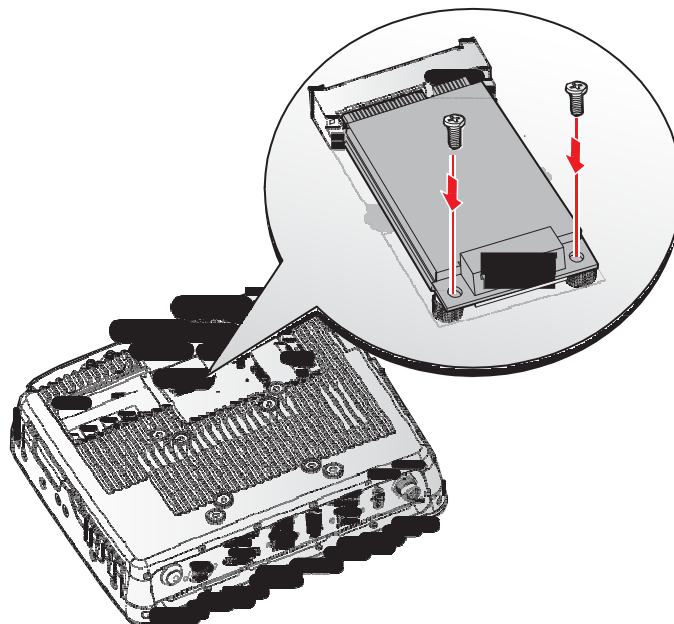
12. Connect the mini PCIe cabling to the mini PCIe card.

13. Install the SSD module. See *"SSD Module"* on page 32.

14. Replace the service cover. See *"Replacing the Service Cover"* on page 28.
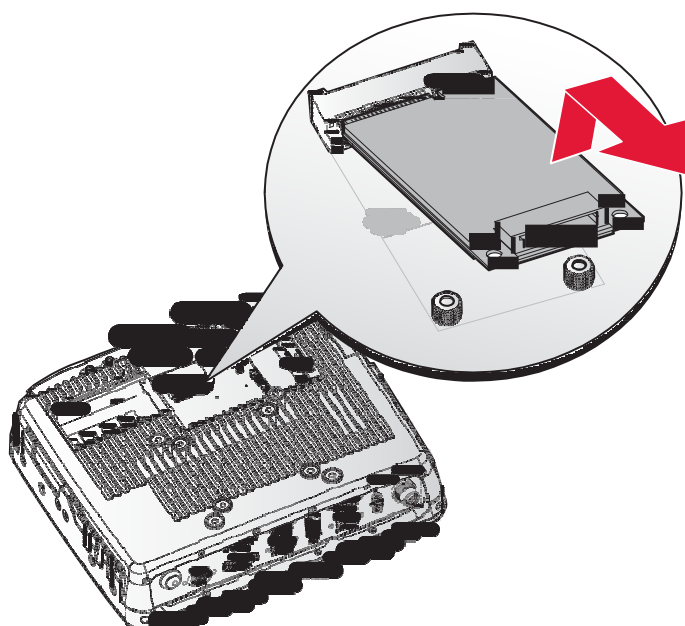
Removing a mini PCIe Card

1. Power down the device and disconnect from all the power source.
2. Unmount the device from the mounting apparatus.
3. Place the device display side down on a clean work surface.
4. Open the service cover. See *"Removing the Service Cover"* on page 27.
5. Remove the SSD module. See *"Removing an SSD Module"* on page 34.
6. Disconnect mini PCIe cabling from the mini PCIe card.
7. Remove the screws securing the mini PCIe card to the VM-521.

Figure 38. Removing the Screws

8. Disconnect the mini PCIe card from the VM-521.

Figure 39. Removing a mini PCIe Card

9.   Install the SSD module. See *"SSD Module"* on page 32.

10. Replace the service cover. See *"Replacing the Service Cover"* on page 28.

Removing the Communications Cover

The communications bay is located on the left rear side of the device. For further information see *"Device Overview"* on page 11.

1. Power down the device and disconnect from all the power source.

2. Unmount the device from the mounting apparatus.

3. Place the device display side down on a clean work surface.

4. Locate the communications cover.

Figure 45. Rear View: Locating the Communications Cover

5. Remove the screws securing the cover.

Figure 46. Removing the Screws

6. Open the cover as shown in the following image.

Figure 47. Removing the Communications Cover

Once the communications cover is removed, you can install or remove the following items:
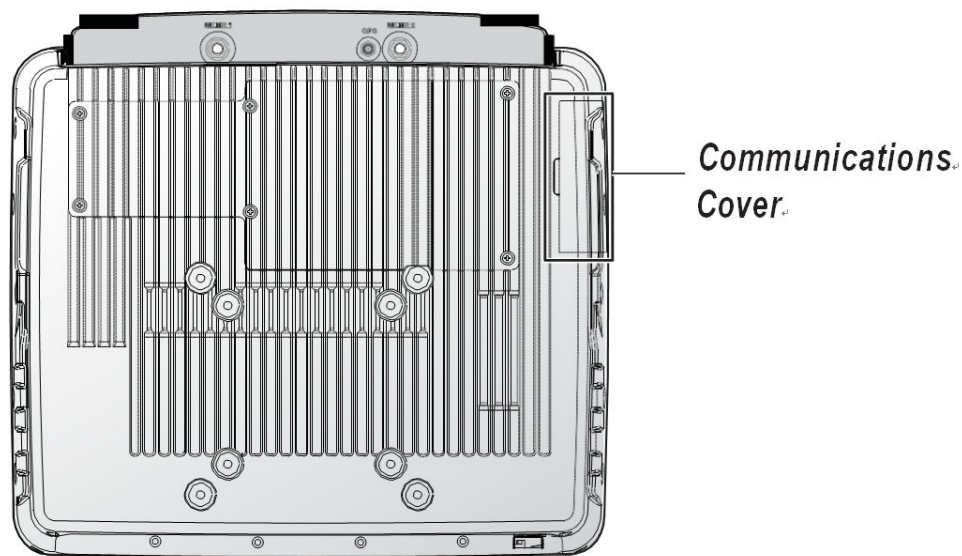
,, SD card

Replacing the Communications Cover

The communications bay is located on the left rear side of the device. For further information see *"Device Overview"* on page 11.
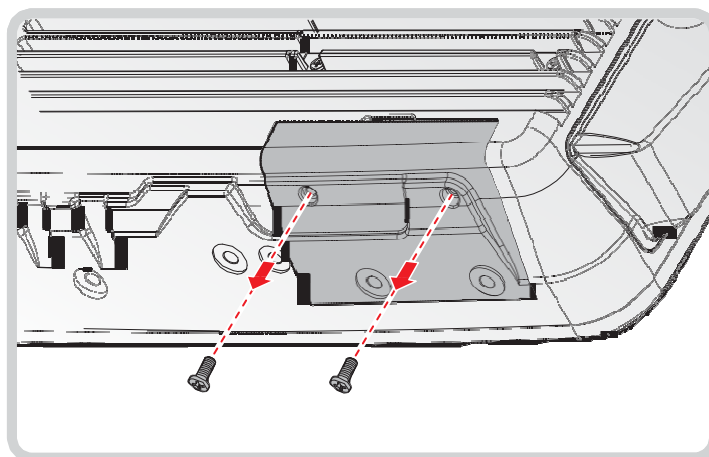
1. Power down the device and disconnect from all the power source.

2. Unmount the device from the mounting apparatus.

3. Place the device display side down on a clean work surface.

4. Locate the communications cover.

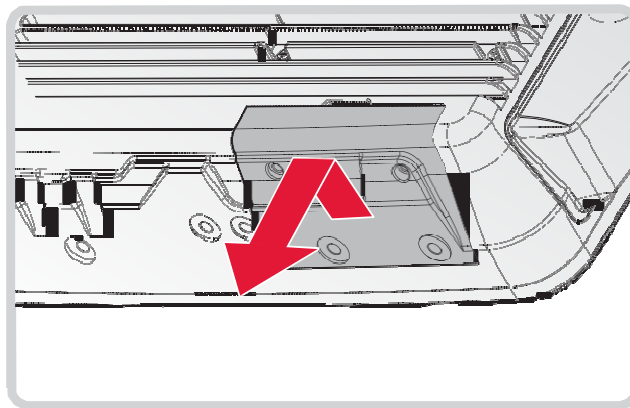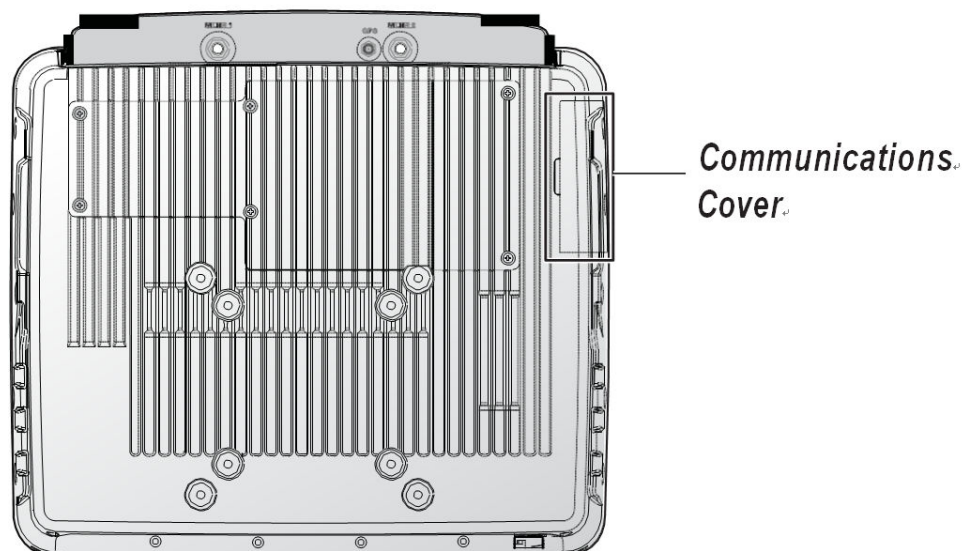*Figure 48. Rear View: Locating the Communications Cover*

Communications Cover

5. Align the tabs on the bottom of the cover with the indentations in the bay.

6. Angle the bottom of the device and insert the tabs in the protrusions. See the following image.

7. Slide the remaining part of the cover in place.

   Gently press it in place to seat it properly. If installed correctly, there should be no gaps between the cover and the chassis.

Figure 49. Inserting the Communications Cover

8. Secure the communications cover and the VM-521 with screws.

Figure 50. Securing the Screws

9. Return the device to the mounting apparatus and install.

Installing an SD Card

The device supports different types of memory cards for easier data storage. The supported types for SD cards are as follows:

- „ SD card
- „ SDHC card
- „ Mini-SD card (with adapter)

1. Power down the device and disconnect from all power sources.

2. Unmount the device from the mounting apparatus.

3. Place the device display side down on a clean work surface.

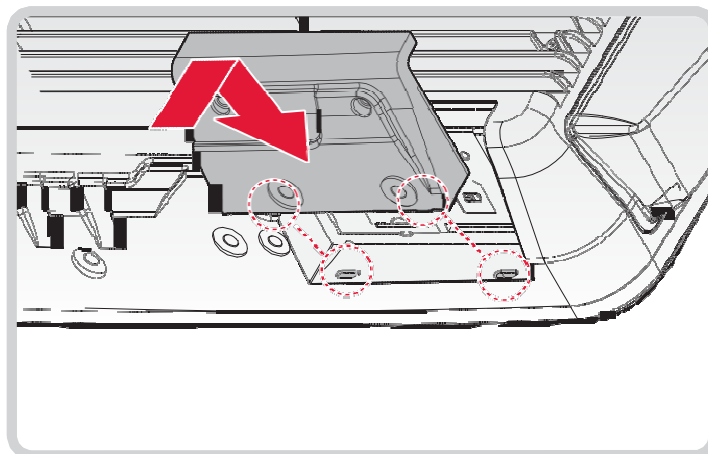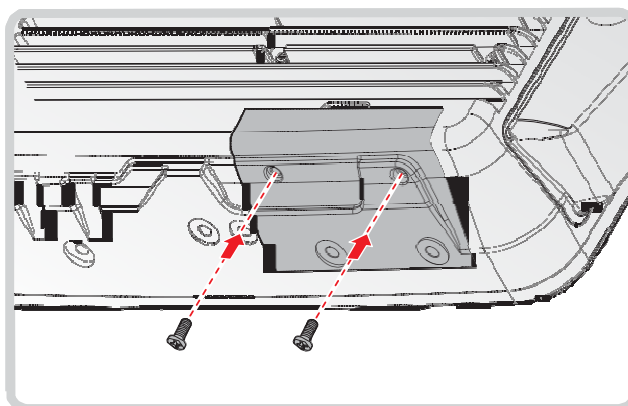4. Remove the communications cover. See *"Removing the Communications Cover"* on page 41.

5. Locate the SD slot in the communications bay.

6. Take the SD card from its packaging.

7. The SD card has a corner missing. Align the SD card with the slot making sure that the corners match.

8. Insert the SD card and press it in until an audible click sounds.

Figure 53. Installing an SD Card
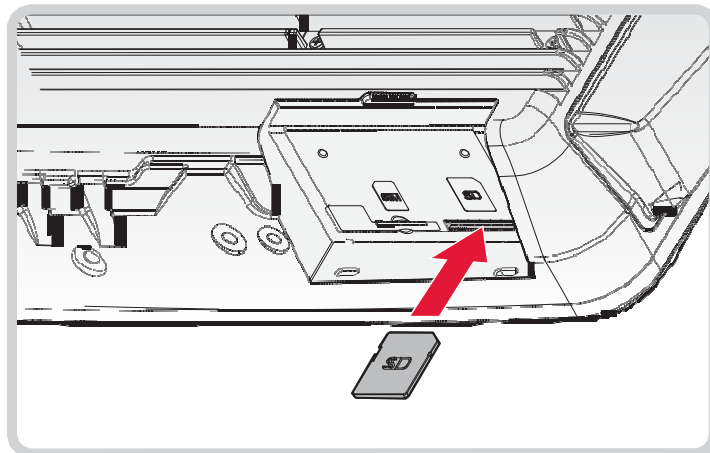
9. Replace the communications cover. See *"Replacing the Communications Cover"* on page 42.

Removing the SD Card

1. Power down the device and disconnect from all the power source.

2. Unmount the device from the mounting apparatus.

3. Place the device display side down on a clean work surface.

4. Locate the communications cover and remove it. See *"Removing the Communications Cover"* on page 41.

5. Press the SD card in and release it. The card springs out.

6. Grasp the SD card and remove it from the slot.

Figure 54. Removing an SD Card
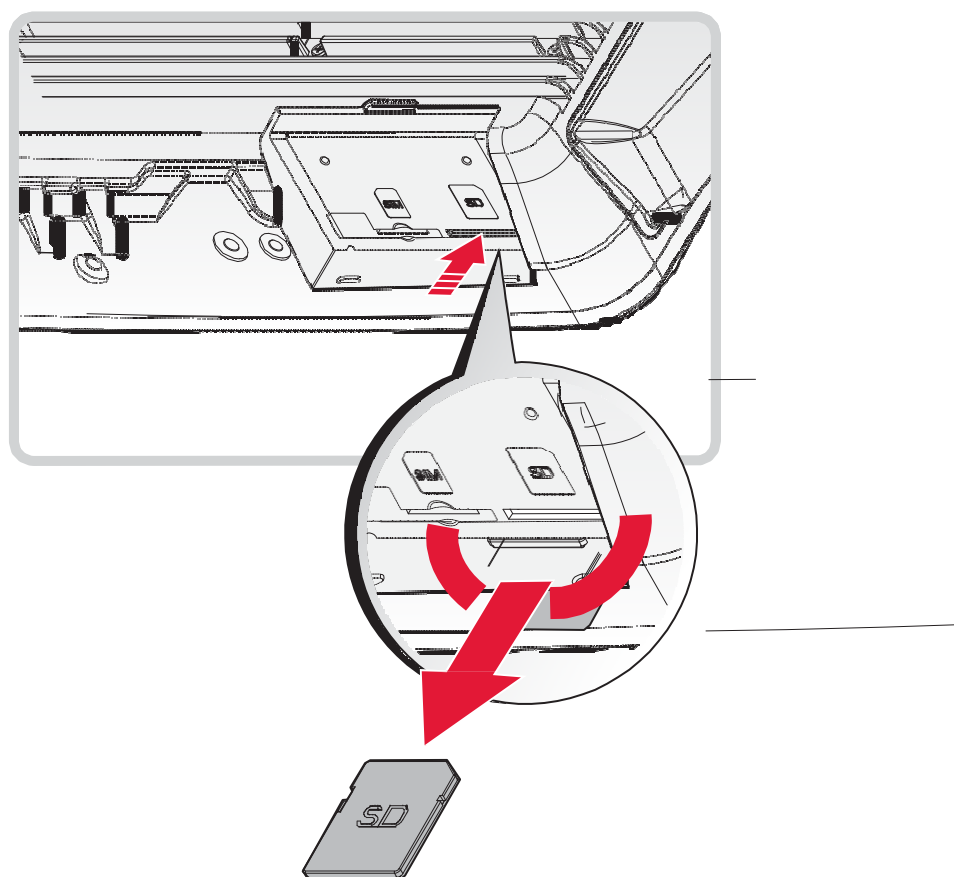
7. Replace the communications cover. See *"Replacing the Communications Cover"* on page 42.

Installing Antennas
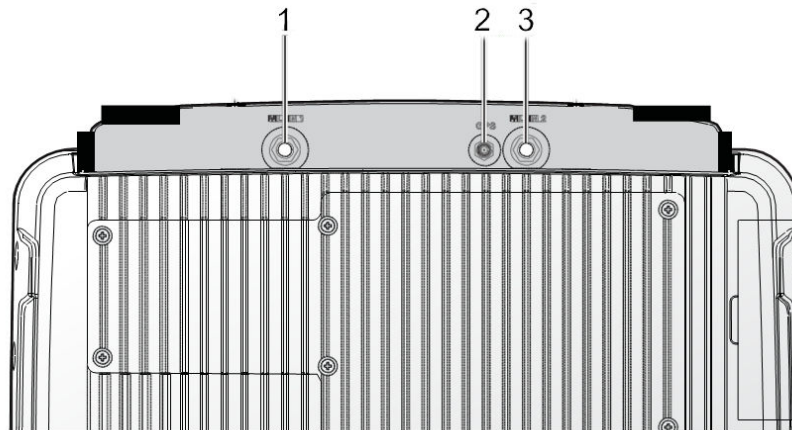
Figure 55. Antenna Instllation

Table 7. Antenna

No	Item	Descri
1	WLAN1	Connect WLAN1 antenna.
2	GPS	Connect GPS antenna.
3	WLAN2	Connect WLAN2 antenna.

Selecting an Antenna Site/Location on a Metal Body Vehicle

1. External installation – Check the requirements of the antenna supplier and install the vehicle antenna external to a metal body vehicle in accordance with those requirements.

2. Roof top – For optimum performance and compliance with RF Energy Safety standards, mount the antenna at the center area of the roof.

3. Ensure that the installation surface is grounded by connecting grounding straps between the surface and the vehicle chassis.

4. Ensure that the antenna cable can be easily routed to the VM-521. Route the antenna cable as far away as possible from any vehicle electronic units and its associated wiring.

5. Check the antenna location for any electrical interference.

Connecting a WLAN Radio Antenna

The WLAN antenna for the VM-521 mobile workstation is an optional component available through your representative. For WLAN connector locations see *"Installing Antennas"* on page 48.

An external WLAN antenna jack is located on the rear of the device. To connect an external antenna, the connector end of the antenna must be RP SMA male to fit into the RP SMA female jack on the device.

To install the WLAN antenna to the vehicle, refer to the installation instructions as referred by the manufacturer of the antenna.

GPS Antenna Connection

The GPS antenna for the VM-521 mobile workstation is an optional component available through your representative. For GPS connector locations see *"Installing Antennas"* on page 48.

An external GPS antenna jack is located on the rear of the device. To connect an external antenna, the connector end of the antenna must be RP SMA male to fit into the RP SMA female jack on the device.

To install the GPS antenna to the vehicle, refer to the installation instructions as referred by the manufacturer of the antenna.

To prevent a short circuit from occurring, the fitting differential between the center conductor and the ground GPS antenna should be 3.0V or lower.

Chapter 4. Hardware Mounting

Mounting Instructions

Read all instructions thoroughly before beginning the installation procedure. See the User Manual for further safety and installation information.

> ⓘ *To prevent the damage to the hardware or injury to personnel, always ensure that there are two individuals to help in carrying and supporting the installation/removal process.*

Assembly Site

The VM-521 is ruggedized for harsh operational conditions. For best installation practices observe the following installation guidelines:

„ Do not expose the Industrial PC to direct heat. Make sure that there is sufficient cross ventilation.

„ Allow at least 15 mm more depth for front installation devices to ensure sufficient air circulation.

„ Do not mount the device on equipment that strongly vibrates. Shock absorbers and vibration dampers may be required if installing in such environments.

Tools Required

You need the following tools for mounting or opening the device:

„ Philips recessed head screwdriver, size 1 (PH 1)

Device Enclosure

The VM-521 supports the installation of various wall and wall mounting brackets. The following illustrations displays the screw locations for the supported installation types.

> ⓘ *To prevent any damage or injury, make sure the mounting bracket is securely attached.*

The VM-521 also supports two types of VESA mounts.

Figure 56. Rear View, dimensions in centimeters and inches
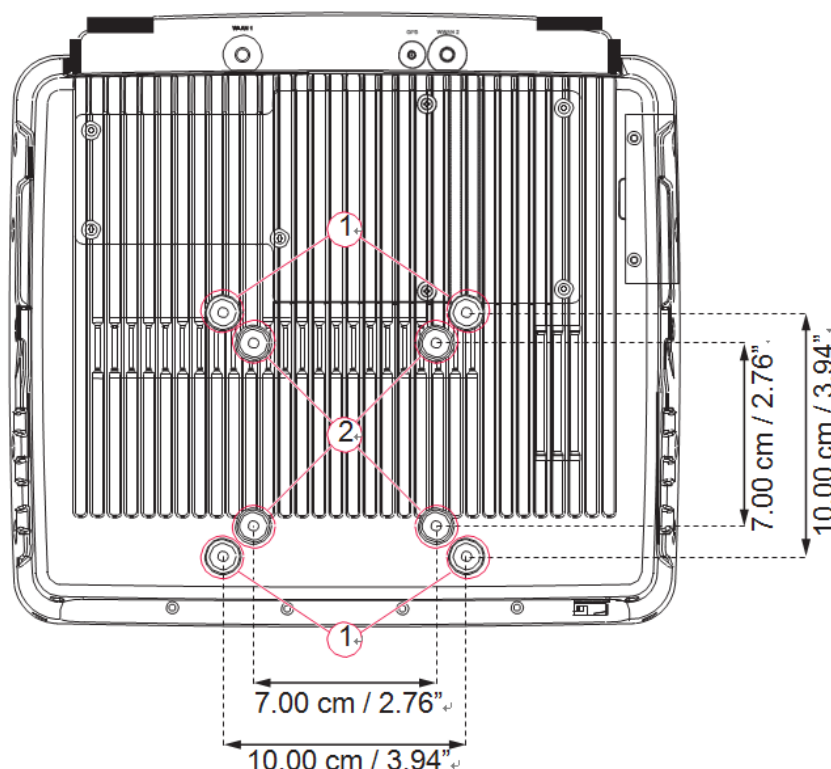
VESA 100 Mounting Option

VESA 100 mounting option, M5 thread

The VM-521 supports a standard VESA version MIS-D, 100, C (100 mm distance quadrate order, M5 thread, deepness 7.5 mm) through the four drill holes (See 1 in *"Figure 56. Rear View, dimensions in centimeters and inches"* on page 51) on the back side of the device.

VESA 75 Mounting Option

VESA 75 mounting option, M5 thread

The VM-521 supports a standard VESA version MIS-D, 75, C (75 mm distance quadrate order, M5 thread, deepness 7.5 mm) through the four drill holes (See 1 in *"Figure 56. Rear View, dimensions in centimeters and inches"* on page 51) on the back side of the device.

Device Cooling

The VM-521 is designed to use a passive cooling concept. The generated heat from the device is dissipated through the surface of the housing. The proper function of the design requires the use of air circulation. It is not advisable to install the device in a closed environment where air circulation is poor and heat dissipation is not possible.

Overheating may occur if the device does not have access to fresh cooling air. The maximum permissible ambient temperature for the entire system must be taken into consideration during installation.

Power Supply

The VM-521 is equipped with a galvanically separated, integrated DC power supply, located on the underside of the device.

> ⚠ *Support the cable and avoid crushing, stressing and overbending it. Cables should never be allowed to hang freely for long distances or to press against edges in an installation.*
>
> ***Only use original power supply cables from RuggON.***
>
> *RuggON power cables meet the specific requirements to power the device.*
>
> *If other power supply cables are used:*
>
> *- The user/operator is solely responsible for the resulting damage. All warranties by RuggON are voided.*

Vehicle Applications

The information in this section is intended to provide information for vehicle applicaitons.

Electrical Installation

Take the following considerations during the installation:

„ Some forklifts have a chassis that is connected to DC+. By definition, the VM-521 chassis is also connected to DC+. However, any peripheral devices suppling DC- through an interconnector (such as a DC- serial port), a short circuit may occur. Malfunctions will result from this type of setup.

„ Connect the VM-521's as close to the battery as possible. Malfunctions may occur if the the VM-521 is conected to large electrical loads, such as converters for the forklift motor may result in random restarts.

Locating the VM-521 in a Vehicle

If the device is installed in a vehicle, the driver's field of view must always be kept free.

The VM-521 system may not project beyond the vehicle area.

Assembly Overview

Before installing the VM-521 to the vehicle:

„ Prepare the forklift, such as: ignition connection, and correct voltage preparation.

The following installation sequence is recommended:

1. Install the bracket to the vehicle.
2. Install the device to the bracket.

Cable Strain Relief

After installation of the VM-521 and bracket, fasten the cabling.

„ Setup the strain relief.

„ Loosely route the cabling on the strain relief rail.

Completing:

„ Secure the cabling to the strain relief rail.

„ The cabling must be fastened precisely at the cable opening location.

Chapter 5. Operation

Powering the Device

Starting Up the Device

Only power up the VM-521 after connecting all of the cables.

The VM-521 is powered up by connecting it to an appropriate power supply and then using the Power switch.

> The VM-521 must be connected to an SELV circuit. Make sure there is a suitable disconnecting device such as a power switch or circuit breaker in the power supply circuit.

1. Locate the I/O ports at the bottom of the device.
2. Press and hold the power switch for 2 seconds.

Figure 57. Power Up the VM-521
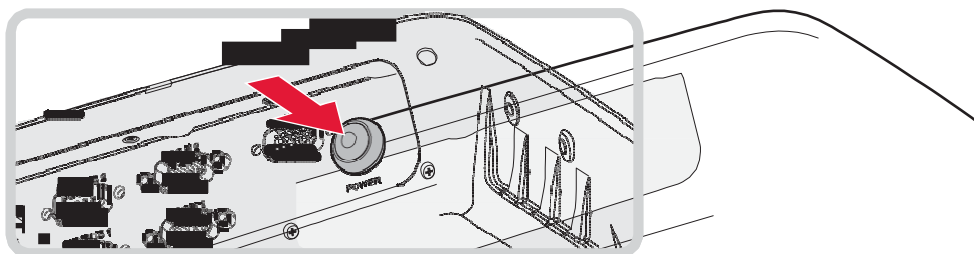
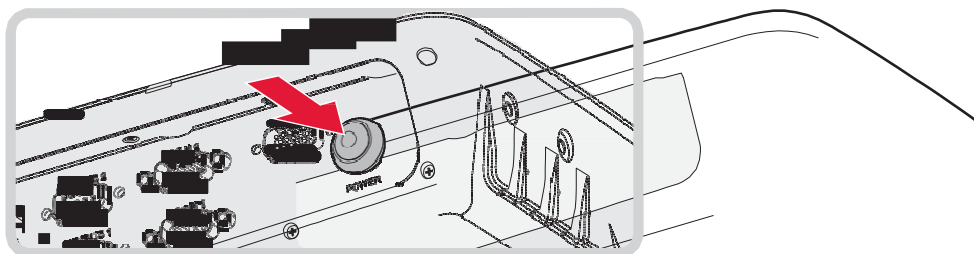### *Powering Down the Device*

The VM-521 can be powered down by using the power switch or through the Windows operating system.

To power down the device:

1. Locate the I/O ports at the bottom of the device.
2. Press and hold the power switch for 5 seconds.

*Figure 58. Powering Down the VM-521*

To shut down the device:

From the Home Screen, tap **Start** > **Shut down**. Once the device is completely powered down, you can remove the power cable (if necessary).

Defrost/Defog Option

The touch screen is available with a defrost and defog function for users who use the device in extreme temperature environments. The function is optional and only available upon request.

Enabling Defrost Function

Figure 59. Defrost Function

Defrost/Defog
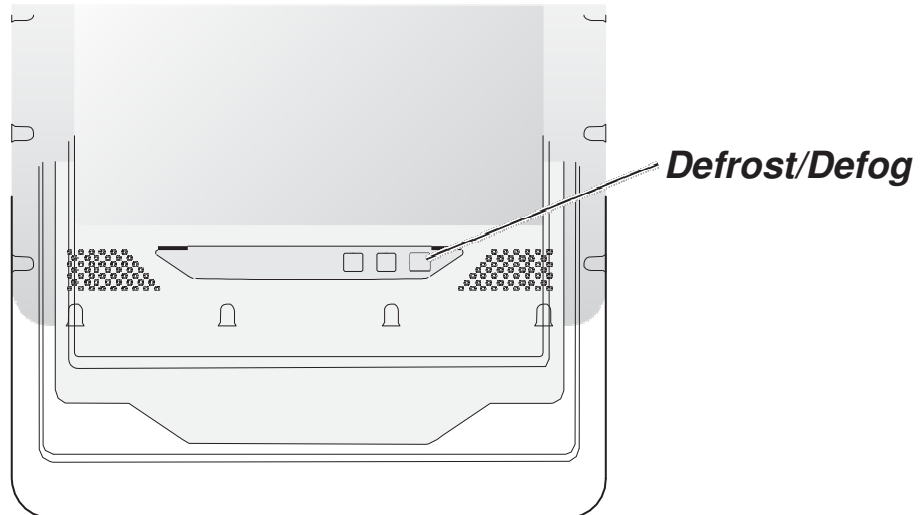
In extreme cold conditions (moving into a cold environment), press the ⌨ button to enable the defrost function and allow the device to heat up the screen to 2 degrees. The defrost function is automatically shuts off once the temperature reaches 2 degrees.

Enabling Defog Function

Figure 60. Defog Function

Defrost/Defog
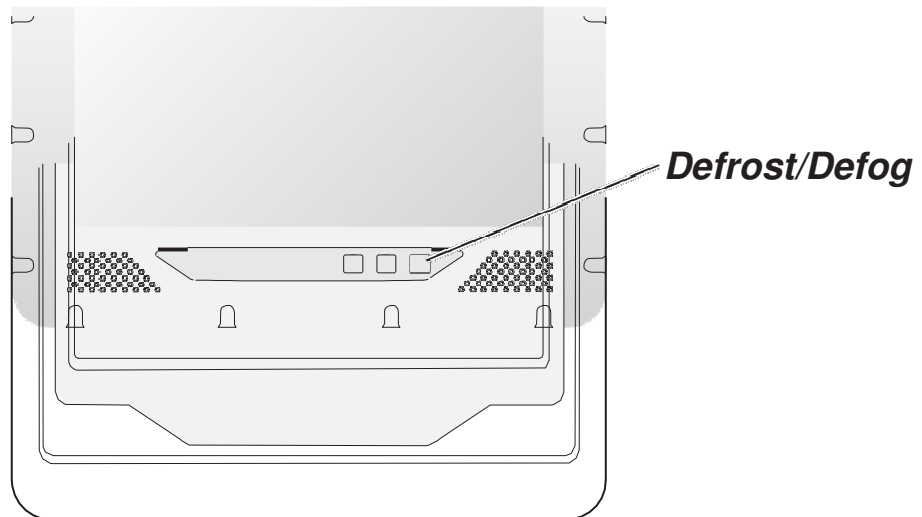
In environments where an extreme temperature changes occurs, cold to hot temperature change, the display can fog up. To enable the defog function, press the ⌨ button to enable the function. The device heats up to 35 degrees. Once the 35 degree temperature is achieved, the function automatically shuts off.

> Once the device reaches 35 degrees, the function automatically shuts off. Pressing the Defrost/Defog key does not re-enable the function.

Brightness and Dimming Control

Figure 61. Brightness and Dimming Function

Brightness and Dimming   Defrost/Defog
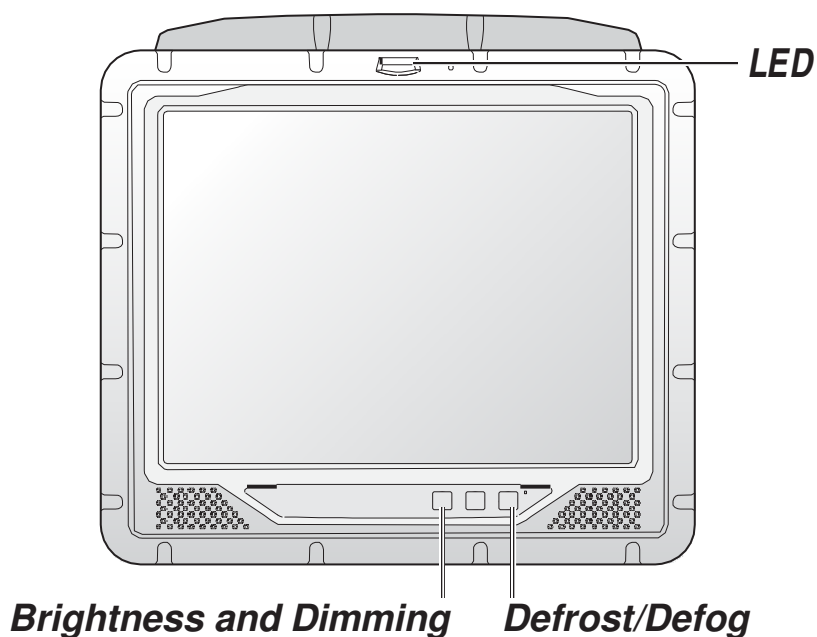
LED Status

Table 8. LED Status

Color	Description
None	Hyper dimming mode or shut down.
Green	Normal.
Red	Battery mode.

Adjust the illumination of the display to setup optimal conditions in Sunlight or Nigh mode operations.

„ Press the ⬤ button to decrease the illumination to Night mode.

„ Press the ⬤ button to increase the illumination to Sunlight mode.

Calibrating the Touch Screen

The touch screens of all VM-521 devices that come delivered with an operating system (Windows or Linux) are already calibrated.

You may need to calibrate your screen if you tap on one area and it registers in a different area of the screen. Make sure you use the stylus to complete the alignment process.

1. Tap **Start** > **All Programs** > **HIDeGalaxTouch Tool** > **HIDeGalaxTouch Tool**. The HIDeGalaxTouch Tool appears.

Figure 62. HIDeGalaxTouch Tool
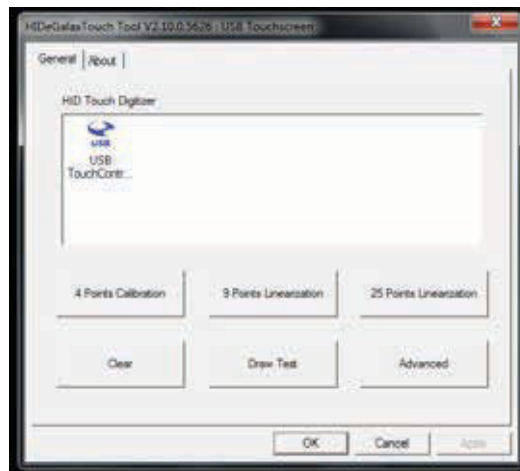
2. Tap **4 Points Calibration**, **9 Points Linearization** or **25 Points Linearization to** begin the process. The calibration process beings and calibration points are displayed on the screen.

3. Tap each calibration point as directed by the process.

Figure 63. Calibration Screen
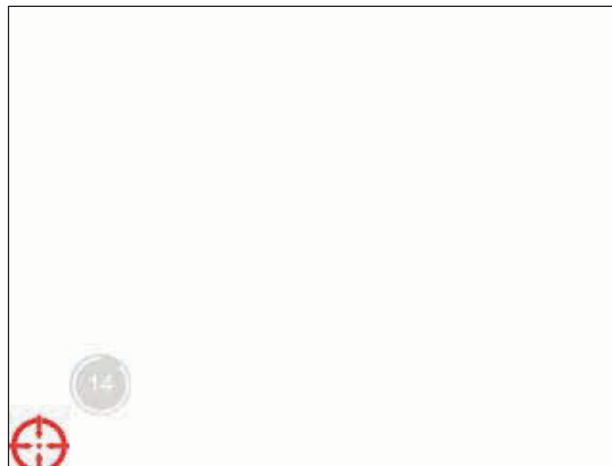
4. Tap and hold until the display shows OK.

Figure 64. Calibration Screen

5. Continue to follow the instructions until the process is finished.

6. Once calibration is achieved a prompt displays. Tap **OK** to complete the calibrate process.

Figure 65. Complete Calibrate

Protective Film

The front display of the VM-521 is protected during transport by the use of a transparent film. This film should remain on the front display during assembly to avoid damage to the front display surface.
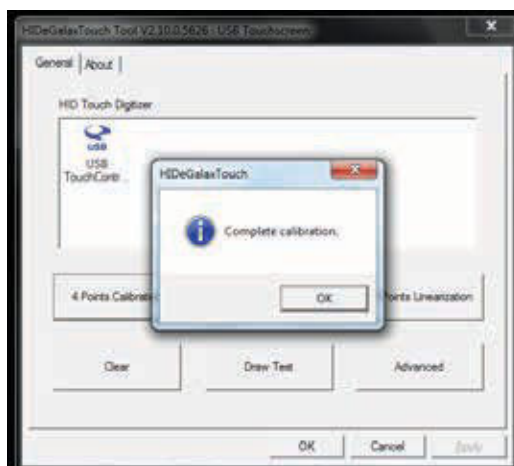
Only remove the film after all of the assembly work has been completed.

Removing the Protective Film

Grasp the edge of the film to lift it up and pull it away from the screen.

Figure 66. Removing the Protective Film
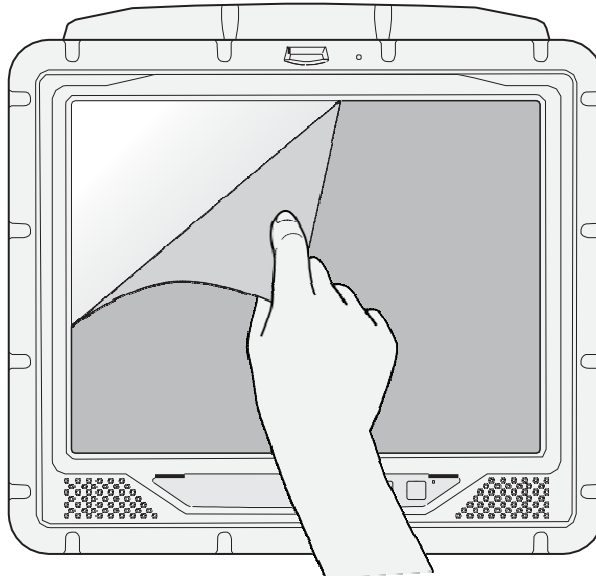
Installing a New Protective Film

For instructions on installing a new protective film, see the documentation provided in the protective sreen replacement kit.

> Remove the existing protective film before installing a new one.

VM-521 Configuration Options

Date and Time

Use the following to set the Date and Time.

„ Press **FN Key** > press or tap **Control Panel** > **Clock, Language an Region** > **Date and Time**

Power Management

Use the following to set the power management options.

„ Press **FN Key** > press or tap **Control Panel** > **Hardware and Sound** > **Power Options**

Speaker Volume

Use the following to set the speaker volume.

" Press **FN Key** > press or tap **Start** > **Control Panel** > **Hardware and Sound** > **Sound**

Connect Bluetooth Devices

Use the following to set the speaker volume.

" Press **FN Key** > press or tap **Control Panel** > **Bluetooth Devices**

Restart/Shutdown

Use the Windows interface to restart or shut down the VM-521.

" To restart: Press **FN Key** > press or tap **Start** > arrow next to Shut down > **Restart**

" To shut down: Press **FN Key** > press or tap **Start** > **Shut down**

Chapter 6. Troubleshooting

Use the troubleshooting tables in this section to fix problems with the Wi-Fi connection, 802.1x security, or general problems with operating the computer.

If you send the computer in for service, it is the user's responsibility to save any data, settings, and configuration. RuggON is only responsible for hardware when repairing or replacing the device.

Troubleshooting the Wi-Fi Connection

Use this troubleshooting table to help solve problems with your 802.11 radio connection.

Q. When you turn on the computer after it was suspended for a while (10 to 15 minutes or longer), it can no longer send or receive messages over the network.

A. Host may have deactivated or lost current terminal emulation session. In a TCP/IP direct connect network, turn off the "Keep Alive" message from host to maintain the TCP session while the computer is suspended.

Q. The computer is connected to the network and you move to a new site to collect data. Your computer now shows you are not connected to the network.

A. Move closer to an access point or to a different location to reestablish communications until you reconnect with the network.

Q. The computer appears to be connected to the network, but you cannot establish a terminal emulation session with the host computer.

A. There may be a problem with the host computer, or with the connection between the access point and the host computer. Check with the network administrator to make sure the host is running and allowing users to log in to the system.

Q. The computer appears to be connected to the network, but the host computer is not receiving any information from the computer.

A. There may be a problem with the connection between the access point and the host computer. Check with the network administrator or use your access point user's manual.

Q. A network connection icon appears in the toolbar, but then disappears.

A. The computer may not be communicating with the intended access point. Make sure the network name matches the access point network name.
The access point may not be communicating with the server. Ensure the access point is turned on, properly configured, and has 802.1x security enabled.

Troubleshooting 802.1x Security

Use the following table to troubleshoot problems with your 802.1x security that will prevent you from connecting to your network, such as an incorrect password.

Q. The computer indicates it is not authenticated.

A. Make sure that:

„ The User Name and Password parameters on the computer must match the user name and password on authentication server. You may need to reenter the password on both the computer and authentication server.

„ On your authentication server, the user and group are allowed and the group policy is allowed to log into the server. For help, see the documentation that shipped with your authentication server software.

„ The IP address and secret key for access point must match the IP address and secret key on the authentication server. You may need to reenter the IP address and secret key on both your access point and authentication server. • the authentication server software is running on the server PC.

Q. You receive a message saying "The server certificate has expired or your system date is incorrect" after you perform a clean boot on the computer.

A. Date and time are not saved when you perform a clean boot. Reenter the date and time, and then save your changes.

Troubleshooting Device Operations

Use this section to troubleshoot problems that may arise and keep you from operating the device as instructed.

Q. What is happening? I press the Power button and nothing happens.

A. First, make sure the power cable is correctly connected to the device. If the power cable is attached, check to see if the power cable is connected to the power source and that the power source is functioning properly.

Q. My device is not responding. The screens appears to be frozen. What can I do?

A. Restart the computer.

Q. I am tapping the screen, but nothing is happening. Is there something I can do?

A. The touch screen may require re-calibration. For help, see "Calibrate the Screen" on page 17.

Call Product Support

If you cannot find the answer to your problem in the *"Troubleshooting"* section, you can visit the RuggON technical knowledge base (Knowledge Central) at www.ruggon.com to review technical information or to request technical support. If you still need help after visiting Knowledge Central, you may need to call Product Support.

To talk to a RuggON Product Support representative, call:

1-800-755-5505

Before you can call RuggON Product Support, make sure you have the following information ready:

- „ Configuration number
- „ Serial number
- „ Operating system, BIOS, and MCU versions
- „ Service pack version
- „ System component versions
- „ If you are using security, know the type and the full set of parameters
- „ If you are using RuggON Terminal Emulator, know the version and protocol. If you are not using RuggON Terminal Emulator, know the language your custom application was written in and the tools you used to create it.

You can find most of the information listed above in RuggON Settings. Consult your application developer for information on your custom application.

Chapter 7. Maintenance

Cleaning the Device

! *Danger to electric shock when cleaning or maintaining the VM-521.*
   To avoid electric shock, turn the VM-521 off and disconnect it from the power supply before cleaning or maintaining it.

Housing

„ The housing of the VM-521 is best cleaned with a damp cloth.

„ Use compressed air, a high-pressure cleaner or vacuum cleaner may damage the surface.

„ Use a high-pressure cleaner, the additional risk of water entering the VM-521 may damage the electronics or touch screen.

Touch Screen

„ Use neutral detergent or isopropyl alcohol on a clean soft cloth to clean the panel surface.

„ Prevent using any kind of chemical solvent, acidic or alkali solution.

Returning the Device

Please put the contents in the original package gently when you need to return the VM-521.

Contacting RuggON

If you experience technical difficulties, please consult your distributor or contact the technical services department:

www.ruggon.com

Appendix A. Technical Specifications

Port Pin Assignments

Use this section as a reference for the pin assignments of the various ports available on the VM-521.

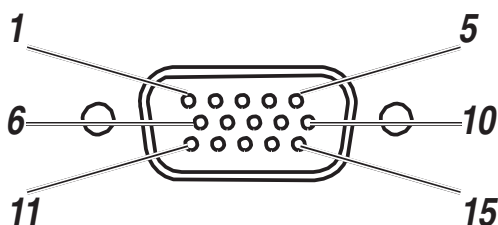### *DIO Port*

Figure 67. DIO Port Pin Assignment

Table 9. DIO Port Pin Assignments

Pin	Signal
1	Digital OUT-1
2	Digital OUT-2
3	Digital OUT-3
4	Digital OUT-4
5	Digital IN-1
6	Digital IN-2
7	Digital IN-3
8	Digital IN-4
9	No connected
10	No connected
11	No connected
12	No connected
13	No connected
14	GND
15	GND

RS-232 Port

By default, pin 9 is configured to provide +5V for an external bar code scanner, or it can be configured to provide RI.

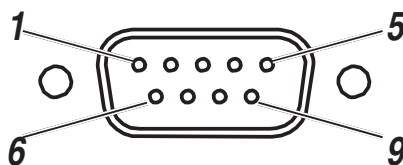*Figure 68. RS-232 Port Pin Assignment*

Table 10. RS-232 Port Pin Assignments

Pin	Signal	Description
1	DCD	Data carrier detect (input)
2	RXD	Receive data (input)
3	TXD	Transmit data (output)
4	DTR	Data terminal ready (output)
5	GND	Signal/power ground
6	DSR	Data set ready (input)
7	RTS	Request to send (output)
8	CTS	Clear to send (input)
9	RI / PWR	Bar code scanner power (300 mA max) or Ring indicator (input)

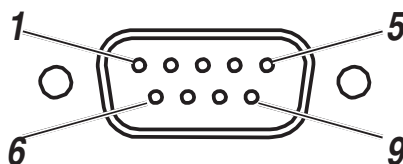## RS-422/RS-485 Port

Figure 69. RS-422/RS-485 Port Pin Assignment

Table 11. RS-422/RS-485 Port Pin Assignments

Pin	Signal
1	GND
2	RS485+
3	No connected
4	RS422_RX+
5	RS422_RX-
6	RS485-
7	No connected
8	RS422_TX+
9	RS422_TX-

CANBUS Ports

Figure 70. CANBUS Ports Pin Assignment
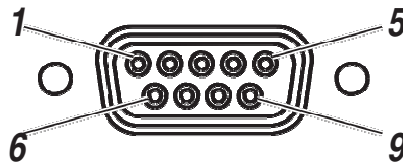
Table 12. CANBUS Ports Pin Assignments

Pin	Signal	Description
1	-	No connected
2	CAN_L	CAN_L bus line dominant low 5V level
3	GND	Ground
4	-	No connected
5	-	No connected
6	-	No connected
7	CAN_H	CAN_H bus line dominant high 5V level
8	-	No connected
9	-	No connected

Expansion Port

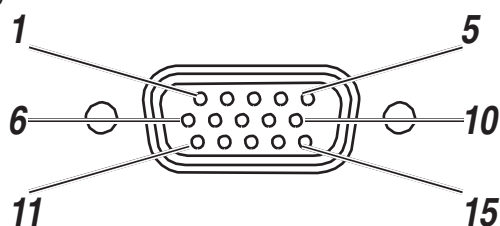*Figure 71. EXPANSION Port Pin Assignment*

Table 13. EXPANSION Port Pin Assignments

Pin	Signal	Description
1	CH1: Audio Left	Audio left input
2	CH2: Video	Video input
3	CH2: Audio Right	Audio right input
4	NC	No connected
5	CH3: Audio Right	Audio right input
6	CH1: Video	Video
7	CH1: Audio Right	Audio right input
8	CH2: Audio Left	Audio left input
9	CH3: Video	Video
10	CH3: Audio Left	Audio left input
11	CH4: Video	Video
12	GND	GND
13	CH4: Audio Left	Audio left input
14	CH4: Audio Right	Audio right input
15	GND	GND

USB Port

Figure 72. USB Port Pin Assignment
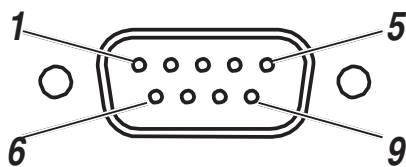
Table 14. USB Port Pin Assignments

Pin	Signal
1	USB2_D-
2	USB2_D+
3	GND
4	USB1_D+
5	USB1_D-
6	GND
7	USB2_PWR
8	USB1_PWR
9	Not used

Power Connector

If you are connecting to an external DC/DC supply, you must apply power to DC+. If you are connecting to 10 to 60V vehicle power, connect power to V In+.
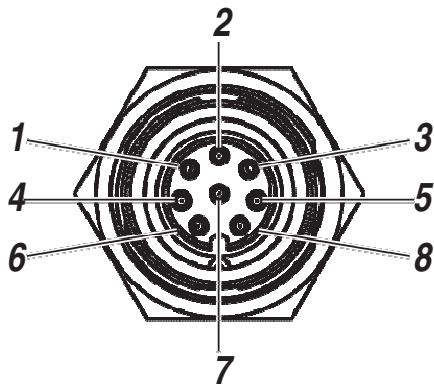
Figure 73. Power Connector

Table 15. Power Connector

Pin	Signal
1	POWER
2	GND
3	GND
4	POWER